PROGRAM facts

U.S. DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY
NATIONAL ENERGY TECHNOLOGY LABORATORY

Clean Coal Technology Demonstrations

07/2003

CLEAN COAL POWER INITIATIVE (CCPI)

"The level of interest expressed in the first competition was tremendous... a most striking example yet of industry's willingness to invest in a new generation of clean coal technologies. That is a clear indication of the potential to develop and apply technology to improve our energy security through the use of coal, our most abundant natural resource...the private sector has a wealth of 21st century ideas to meet the President's energy and environmental goals."

Secretary of Energy Spencer Abraham (2002)

Overview

CCPI, initiated by President Bush in 2002, is an innovative technology demonstration program that fosters more efficient clean coal technologies (CCTs) for use in new and existing electric power generating facilities in the United States. Candidate technologies are demonstrated at commercial-scale to ensure proof-of-operation facilitating potential wide-spread use. Technologies emerging from the program will help to meet the President's new environmental objectives for America embodied in the Clear Skies Initiative (CSI), Global Climate Change Initiative (GCCI), and FutureGen. Early demonstrations emphasize technologies that are applicable to existing power plants and also include construction of new plants. Later demonstrations will include, among others, systems comprising advanced turbines, membranes, fuel cells, gasification technologies, and hydrogen production.

The program's center-piece is a government/industry partnership to implement the President's National Energy Policy (NEP) recommendation, accelerating commercial deployment of advanced technologies to ensure reliability of the electric supply while simultaneously protecting the environment. The government/private sector risk-sharing partnership provides the overall expertise and funding needed to ensure successful development of innovative technologies. Priorities covered by the NEP include increasing domestic energy supply, protecting the environment, ensuring a comprehensive energy delivery system, and enhancing national energy security and thereby the security of our domestic economy.

CCPI is a multi-year program funded at a total federal cost of up to $2 billion with the private sector cost-share being at least 50 percent. Funding

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CLEAN COAL TECHNOLOGY DEMONSTRATIONS

www.netl.doe.gov/coalpower/ccpi/index.html
www.lanl.gov/projects/cctc/programs/program.html

NETL WEBSITE

www.netl.doe.gov

DOE Office of Fossil Energy is demonstrating advanced coal technologies that help achieve ...

will be provided to companies selected through competitive bidding that can move promising new concepts rapidly to a point to allow private sector decisions on deployment. CCPI will help to provide the nation with a reliable, affordable, secure, and sustainable energy supply by building on the successful accomplishments of a joint government-industry Clean Coal Technology (CCT) program in the 1980s and 1990s that helped achieve sharp declines in pollutant emissions from U.S. power plants. Success of the CCPI program will remove many of the environmental issues associated with fossil-fuel use and provide high-efficiency, low-cost, future generating capacity.

Mission

The CCPI Mission is to:

- Realize environmental and economic benefits through DOE/industry partnerships
- Move promising yet commercially risky advanced coal energy systems to market

Planning and Management

CCPI is managed by the Department of Energy's (DOE) Office of Fossil Energy (FE) and implemented by the National Energy Technology Laboratory (NETL). To ensure programmatic success, stakeholder input is aggressively sought through workshops and strategy meetings. Such events form an integral part of the overall planning picture, allowing multiple opportunities for the federal government to communicate with stakeholders. Planning input comes from industry, environmental and state organizations; technology proposers, hosts, and developers; universities; interested state and Federal organizations (state support groups); and interested parties.

Program Importance

CCPI leverages public investment with substantial investment from the private sector in our nation's future economic stability and security through clean coal research. This investment strategy recognizes the crucial benefits to this country's economy, energy security, and environment that are associated with the use of CCTs that can provide an important part of our immediate and future energy supply needs. Electricity requirements for the nation are steadily increasing. New generation technology is needed to meet this growth and to replace aging capacity. CCPI will help to meet these electricity demands and minimize disruptions by demonstrating new generation technologies. CCPI will enable effective use of existing assets and prepare for their retirement by demonstrating the latest technological improvements in efficiency, advanced low-cost high-performance emissions control technologies, and reliability at new and existing plants.

Coal reserves within America's borders represent about a 250-year supply of secure, low-cost energy at current use rates. One of our most affordable and indispensable energy resources, it currently supplies more than half the nation's electricity, with about 90 percent of all coal consumed being used for electricity production. CCPI will help ensure that coal will continue to be a substantial part of the nation's future energy mix by demonstrating large-scale, highly efficient, and more environmentally friendly generation technologies.

Because of its relatively clean-burning characteristics and general affordability, an increasing dependence on natural gas for power production is emerging in the U.S. Reliance on gas poses an inherent price risk. Increasingly, gas supply is coming from imports. Maintaining low-cost, affordable, clean electricity requires flexibility in both fuels and generation technology. To become less dependent on imports, domestic energy production must be increased. Since economic growth is linked to energy prices, continued use of indigenous coal to maintain fuel flexibility is vitally important to our economy and national security. CCPI technologies will reduce pollutants to a small fraction of the levels of older, conventional coal-burning plants. By reducing barriers to continued coal use, CCPI will play a large part in continuing our global leadership position, enhancing market opportunities for U.S. energy-related technologies, services, and resources.

Technology Roadmap

CCPI fits within FE's Coal and Power System's strategic direction for fostering economic growth while protecting the environment, and supports efficient and sustainable use of domestic energy resources. The program is closely coordinated with RD&D activities being carried out under Central Power Systems core R&D programs that are driving towards ultra-clean fossil fuel-based energy complexes in the 21st century. A consensus technology roadmap has been developed with industry that addresses short-, mid-, and long-term needs. When integrated with other DOE leading-edge initiatives within DOE's Office of Coal & Environmental Systems, such as Vision 21, CCPI will help the nation achieve greater power plant performance, allowing even high-sulfur coals to be burned as cleanly as natural gas. Cost-effective technologies to comply with current and emerging environmental regulations are needed in the short- and mid-term. Coal power plant performance criteria considered include air emissions, by-product utilization, water use and discharge, plant thermal efficiency, reliability/availability, capital and product costs, and CO_2 management. The long-term goals are aimed at achieving near-zero emissions power and clean fuels plants with CO_2 management capability. The President's GCCI commits America to reduce greenhouse gas intensity (the ratio of greenhouse emissions to economic output) by 18 percent over the next decade. Improving power plant efficiency is one of the ways of reducing carbon emissions. CCPI technologies offer the potential to substantially reduce the carbon intensity of our economy.

Clean Coal Power Initiative (CCPI)

Program Implementation

The CCPI program, conducted via four solicitations, focuses on different technologies over its duration. CCPI is driven by the private sector where government responds to industry/academia proposed projects. Potential applicants include industry, manufacturing and service corporations, R&D firms, energy producers, software developers, academia, and other interested parties. Selected projects should address needs not being met by the private sector, technologies that have not been proven commercially, applicability to the existing fleet or future advanced energy systems, and substantial public benefit. The solicitation and project selections for Round 1 were completed in January 2003. Round 2 and subsequent solicitations will be conducted on a two year cycle.

Benefits

The program, by merging public and private sector interests, will benefit the environment, help to sustain enhanced electricity reliability, bolster energy security, and help to ensure an affordable supply of electricity. Successful completion of this initiative will lead to a stronger, more robust domestic economy. The outcome of the program will be new and innovative technologies that are readily accepted by industry and regulators and produce substantial public benefits.

CCPI program benefits, when compared to RD&D investment costs, are expected to be substantial. Unless advanced technologies achieve widespread commercial use (facilitated by the CCPI) the projected benefits will not be achieved. Benefits include reduced fuel costs due to higher plant efficiencies, lower capital costs for construction of new plants and repowered facilities, lower capital and operating costs for existing plants, reduced costs of environmental compliance, avoided environmental costs (e.g., health, infrastructure, agriculture), enhanced industrial competitiveness leading to increased domestic sales and technology exports, and additional jobs. In addition, technology spin-off benefits will likely be created from the program.

Prog052.pmd

CCPI ROUND 1 PARTICIPANT CONTACTS

Colorado Springs Utilities:
Integration of Advanced Emissions Controls to Produce Next-Generation Circulating Fluid Bed Coal Generating Unit
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Great River Energy:
Increasing Power Plant Efficiency–Lignite Fuel Enhancement
Charles Bullinger
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LG&E Energy Corporation:
Commercial Demonstration of the Airborne Process
Don Miller
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NeuCo, Inc.:
Demonstration of Integrated Optimization Software at the Baldwin Energy Complex
Peter J. Kirk
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University of Kentucky Research Foundation:
Advanced Multi-Product Coal Utilization By-Product Processing Plant
Dr. Thomas L. Robl
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Waste Management and Processors Inc. (WMPI PTY., LLC):
Gilberton Coal-to-Clean Fuels and Power Project
Robert Hoppe
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Western Greenbriar Co-Generation, LLC:
Western Greenbriar Co-Production Demonstration Project
Wayne Brown
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Wisconsin Electric Power Company:
TOXECON Retrofit for Mercury and Multi-Pollutant Control on Three 90 MW Coal-Fired Boilers
Richard Johnson
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For project details, visit www.netl.doe.gov/coalpower/ccpi/main.html.